

March 2018
Analytical Chemistry
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Topic: Molecular Spectroscopy

Instructions: Answer each question as concise as possible. There are 5 problems total.

1. Draw a Jablonski Diagram and label the following processes: absorption, fluorescence, internal conversion, intersystem crossing and phosphorescence.
2. A Michelson interferometer is used for FT-IR experiments. A) Draw the interferometer. B) Explain how it operates and the benefits of use. C) What is the purpose of the Fourier Transform?
3. Draw and describe the working principles of a photomultiplier tube for detection.
4. The transmittance of a 1.0mM solution of an absorber in a 2.0cm cuvette is 15% at 320nm. What is the molar absorptivity of this absorber?
5. Semiconductors have made a large footprint in detection device. Draw and describe how a diode array detector works for absorption spectroscopy.